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(71) Applicant(s)
Telefonaktiebolaget L M Ericsson

(Incorporated in Sweden)

S-126 25, Stockholm, Sweden

(72) Inventor(s)
Bart Jellema
Rene Peeren
Louise Croughan
Freek Aben

(74) Agent and/or Address for Service
Haseltine Lake & Co
Imperial House, 15-19 Kingsway, LONDON,
WC2B 6UD, United Kingdom

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(56) Documents Cited
EP 0663641 A1 EP 0661651 A1 US 5418947 A
US 4805099 A

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ONLINE DATABASES: COMPUTER, INSPEC, WPI

(54) Telecommunications one-dimensional database structure

(57) Stored data in a database preferably for use in a telecommunications network are easily accessible in real time by using a data organisation which stores the data in one-dimensional tables. All the information of one type is stored in one such table, and is decoded in a known way. Each table comprises at least one stored data item and one associated data item identifier. The stored data is accessed by sending a message comprising a root address specifying the required data point, an application number identifying the table of interest, a data item identifier e.g. 12a, 12b and a unique query identifier. In response to the message the stored data items e.g. 14a,14b associated with the data item identifier are retrieved and returned linked by the unique query identifier. Information of a different type, in a different format, may be stored in a second table, and decoded in a different known way and the stored data items may be updated by a similar method.

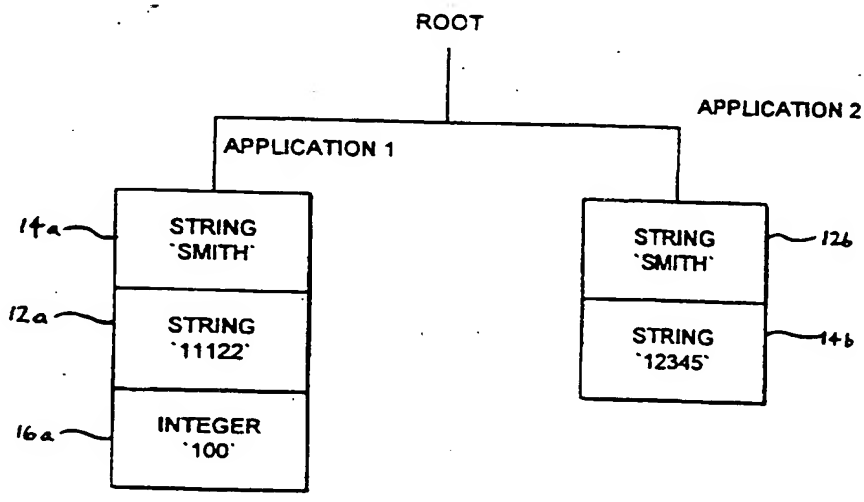

FIG. 2

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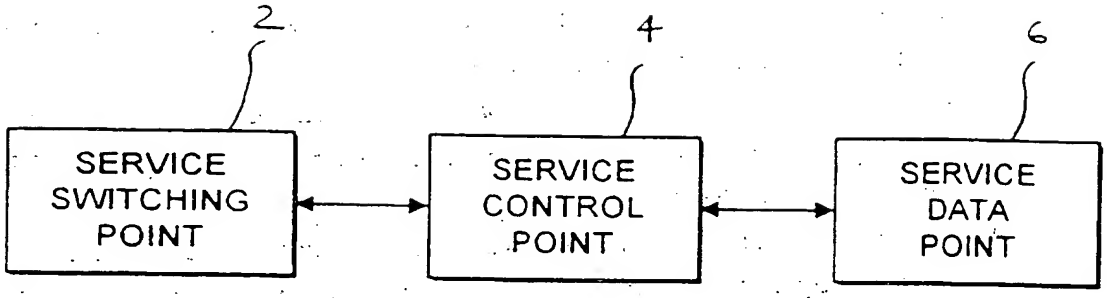

FIG. 1

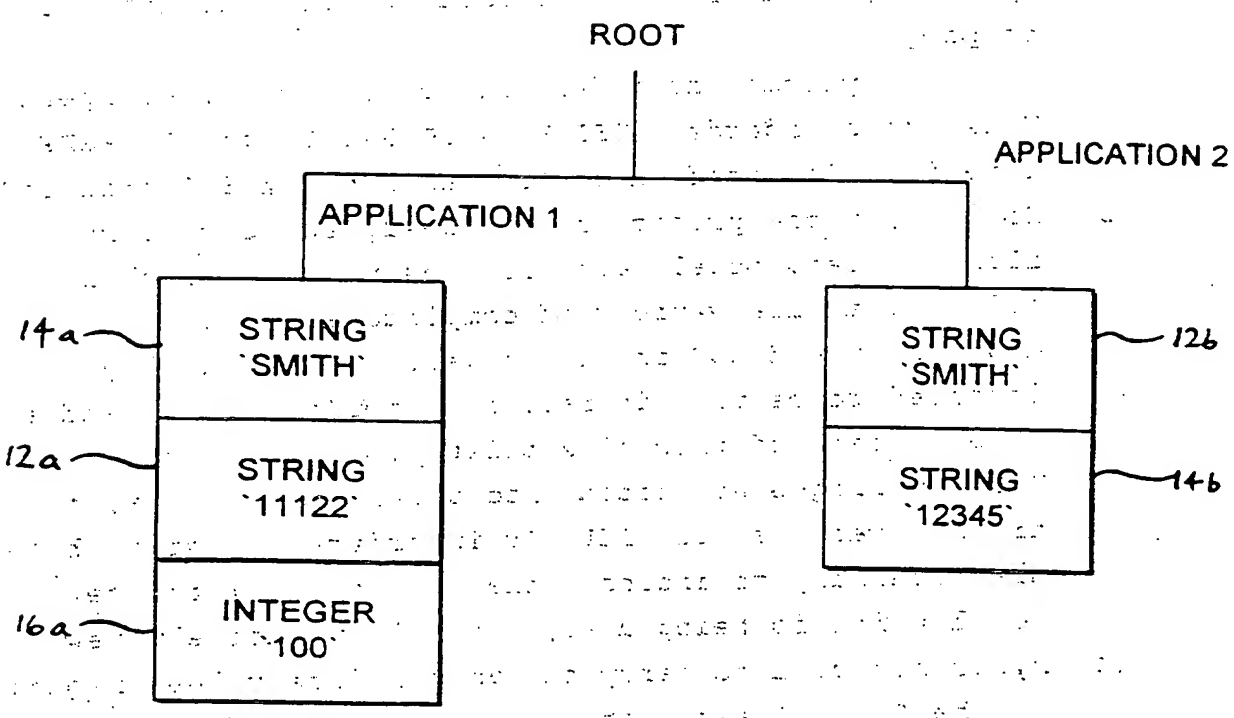

FIG. 2

DATABASE ACCESS

This invention relates to a database access protocol, in particular for use within an Intelligent Networks architecture. Specifically, the invention relates to a protocol which allows data to be retrieved quickly from the database.

An Intelligent Networks architecture typically includes a number of Service Control Points (SCPs), which have Service Switching Points (SSPs) connected to them. Each SSP is a switching system that can intercept telephone calls, and query the SCP. The SCP contains service specific logic and data, that allows it to return instructions to the SSP on how to deal with the intercepted call.

In returning the instructions to the SSP, the SCP may require access to specific customer data stored in an external database. These external databases are referred to as Service Data Points (SDPs). For example, a SDP may be a customer database of a network operator, or a credit card database of a credit card company.

In systems known from the prior art Intelligent Networks standards, ETSI ETS 300 374-1, the SCP-SDP interface is based on the conventional X.500 protocols. However, these protocols were designed to support a flexible data model, and are thus very powerful in allowing a wide variety of complicated data structures. However, the X.500 protocols were not originally intended to be used in real time applications, and so a disadvantage of this flexibility is that, when the X.500 messages are coded into a stream of bytes, to be transferred over the SCP-SDP interface, a lot of bytes are necessary to indicate the structure of the data model which is being used, and only relatively few bytes are used to carry the actual data values required by the SCP. These extra bytes, which need to be coded

and decoded, consume processor time, and cause delays in the processing of Intelligent Networks service requests.

In accordance with the present invention, the data communication protocol used on the SCP-SDP interface is more efficient, because of the simple way in which the data is organised in the database. This allows communication over the SCP-SDP interface to be more efficient, which minimises the time required to process service requests.

For a better understanding of the present invention, reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 is a block schematic diagram of a part of a network architecture in accordance with the present invention; and

Figure 2 is an illustration of the way in which data is organised in accordance with the invention.

As shown in Figure 1, the network includes a Service Switching Point (SSP) 2, connected to a Service Control Point (SCP) 4. Of course, it will be appreciated that, in practice, the network will include a large number of SSPs, and may well include many SCPs, but the illustrated part of the network is sufficient for explanation of the present invention. The SSP 2 intercepts calls sent from an end user (not shown). In order to connect the call, the SSP 2 must obtain information from the SCP 4. Thus, the SCP stores service specific logic and data, that allows it to return instructions to the SSP. However, in order to deal with the service request, the SCP 4 may require access to specific customer data stored in a Service Data Point (SDP) 6.

When it is determined by the SCP that data is required from an external database or SDP, a request is sent to the SDP. Figure 2 is a schematic illustration

of the way in which the data is stored in a series of one-dimensional tables within the SDP. To access the required information, the SCP must address the relevant location in the database. The address includes firstly a root, which identifies the required SDP. Secondly, the message sent from the SCP includes the required application number. This identifies a particular one-dimensional table, within the database. Each one-dimensional table stores information of a particular type. Thus, for example, in Figure 2, there is shown a database organisation with two applications. Application 1 is used to store the cardholder names, and their individual credit limits, associated with particular credit card numbers. Application 2 stores telephone numbers associated with particular telephone subscribers. It will be apparent that the database can include any desired number of applications.

The message sent from the SCP to the SDP thirdly includes a data item identifier 12a, 12b. In the case of application 1, the data item identifier 12a is the credit card number, while in the case of application 2, the data item identifier 12b is the telephone subscriber name.

Finally, the message sent from the SCP to the SDP includes a unique identifier, associated with that query.

In response to the message from the SCP, the SDP identifies the data item or items associated with the received data item identifier. In the case of the data item identifier 12a, the relevant data items 14a, 16a are the credit card holder's name and credit limit respectively. In the case of the data item identifier 12b, the data item 14b is the subscriber's telephone number.

The one-dimensional table indicated by Application 1 stores information in a format which may be different

from the format in which Application 2 stores information. For example, in Application 1, the data item identifier 12a is a number, with a predetermined number of digits, while the stored information elements 14a, 16a are a character string of unknown length and a number of maybe three or four digits. In Application 2, the data item identifier 12b is a character string of unknown length, while the stored information element 14b is a number with a predetermined number of digits. Therefore, the application number determines how stored information is to be coded and decoded.

Thus, in response to the message from the SCP, the SDP retrieves the data item information elements, and returns them to the SCP, in a message which also returns the unique identifier which was sent from the SCP. This allows the SCP to link the received message from the SDP with the relevant request.

Thus, the data organisation within the database allows a very simple way of indicating the data item which is required, and hence allows very short and efficient messages to be sent between the SCP and SDP, without necessitating analysis by the database.

The data organisation also allows data within the database to be updated in a simple way. An update request can include a unique identifier, an application number, a data item identifier, and updated data item information to replace the existing stored data item information. Thus, again, the database can easily identify the data item which is of interest, without requiring much processing. After the relevant data item has been updated, the database can return a message to the SCP, simply containing the unique identifier, which serves as confirmation that the necessary update has been carried out.

It can therefore be seen that the data organisation allows easy access to the data in real time applications.

CLAIMS

1. A method of accessing required information stored in a database, the method comprising storing the information in at least one one-dimensional table, the or each table comprising a plurality of rows, of which at least one contains stored data, and at least one contains a respective data identifier associated with the stored data, the method comprising sending a message including the data identifier associated with the required information, and retrieving the stored data associated with the data identifier.

2. A method of storing information stored in a database, the method comprising storing the information in at least one one-dimensional table, the or each table comprising a plurality of rows, of which at least one contains stored data, and at least one contains a data identifier associated therewith.

3. A method as claimed in claim 2, wherein the information is stored in a plurality of one-dimensional tables, each one-dimensional table storing information of a different type.

4. A method as claimed in claim 2 or 3, wherein each one-dimensional table has an application identifier associated therewith, the application identifier being used to determine how to decode data stored in the associated one-dimensional table.

5. A method as claimed in claim 2, 3 or 4, wherein each one-dimensional table contains a plurality of stored data items, and data identifiers associated therewith, each data item and associated data identifier being in the same format.

6. A telecommunications network, comprising at least one control point and at least one data point, the data point including a database in which information is stored in at least one one-dimensional table, the or each table comprising a plurality of

rows, of which at least one contains stored data, and at least one contains a data identifier associated therewith.

7. A telecommunications network as claimed in claim 6, wherein, when it is determined at the control point that information from the data point is required, a message is sent from the control point to the data point, the message including the data identifier associated with the required information.

The Patent Office

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Application No: GB 9615193.1
Claims searched: 1-7

Examiner: Andrew Alton
Date of search: 23 September 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): G4A: AUDB

Int Cl (Ed.6): G06F: 17/30

Other: Online databases: COMPUTER, INSPEC, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	EP 0663641 A1	MICROSOFT - See Fig. 5 and col. 8, lines 2-12	2
X	EP 0661651 A1	MICROSOFT - See Fig. 7 and col. 6, lines 4-15	2
X	US 5418947	AT&T - See col. 3, Table 1	2
X	US 4805099	WANG - See Fig. 4 and col. 3, lines 4-21	2

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.